GCSE

Additional Mathematics

Summer 2007

Mark Schemes

Issued: October 2007

NORTHERN IRELAND GENERAL CERTIFICATE OF SECONDARY EDUCATION (GCSE) AND NORTHERN IRELAND GENERAL CERTIFICATE OF EDUCATION (GCE)

MARK SCHEMES (2007)

Foreword

Introduction

Mark Schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16- and 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

CONTENTS

Rewarding Learning

General Certificate of Secondary Education
2007

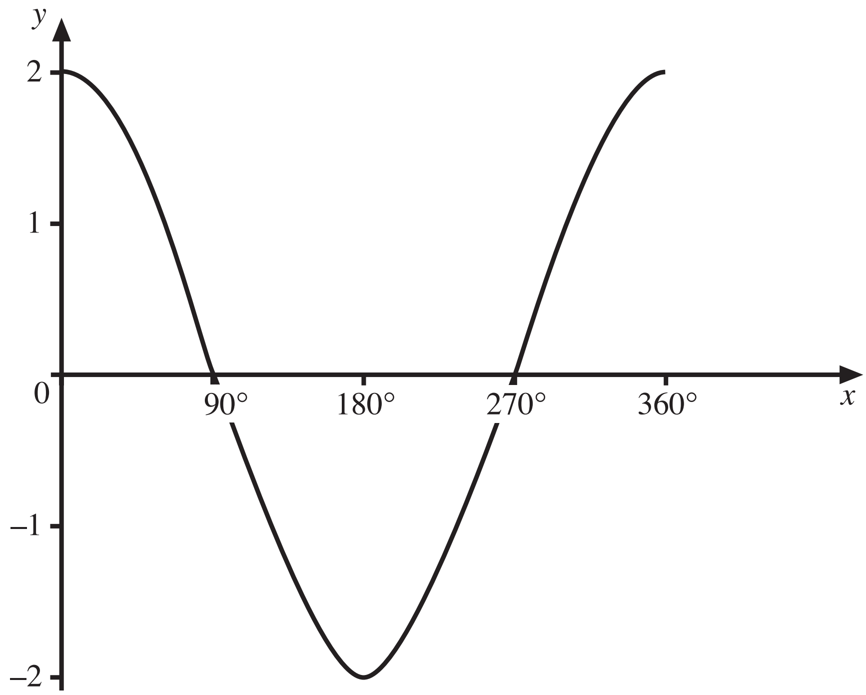
Additional Mathematics

Paper 1
Pure Mathematics

[G0301]

TUESDAY 15 MAY, AFTERNOON

MARK SCHEME

			AVAILABLE MARKS
1		M1 (cos curve) M1 (±2) W1 (cutting axis) M1 (drawing)	4

2 **(i)** $\cos\theta = 0.1$

$\therefore\ \theta = 84.26°$ **or** $-84.26°$ to 2 dp — $2 \times$ MW1

(ii) $\cos(2x - 10°) = 0.1$

From **(i)**

$2x - 10 = 84.26$ **or** -84.26 — M1

$\therefore\ 2x = 94.26$ **or** -74.26

$\therefore\ x = 47.13$ **or** -37.13 to 2 dp — W1 — 4

		AVAILABLE MARKS
3 **(i)** det $\mathbf{A} = -13$		
$\therefore \mathbf{A}^{-1} = -\frac{1}{13}\begin{bmatrix} 1 & -2 \\ -5 & -3 \end{bmatrix}$	MW1, MW1	
$= \frac{1}{13}\begin{bmatrix} -1 & 2 \\ 5 & 3 \end{bmatrix}$		
(ii) $\begin{bmatrix} -3 & 2 \\ 5 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 16 \\ -5 \end{bmatrix}$	M1	
$\therefore \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 & 2 \\ 5 & 1 \end{bmatrix}^{-1}\begin{bmatrix} 16 \\ -5 \end{bmatrix}$		
$= \frac{1}{13}\begin{bmatrix} -1 & 2 \\ 5 & 3 \end{bmatrix}\begin{bmatrix} 16 \\ -5 \end{bmatrix}$	M2	
$= \frac{1}{13}\begin{bmatrix} -26 \\ 65 \end{bmatrix} = \begin{bmatrix} -2 \\ 5 \end{bmatrix}$		
$\therefore x = -2,\ y = 5$	W1	6
4 **(a)** $y = 3x^2 + \frac{2}{x}$		
$\therefore \frac{\mathrm{d}y}{\mathrm{d}x} = 6x - \frac{2}{x^2}$	$2 \times$ MW1	
(b) $\int\left(x^5 - \frac{1}{x^2} + 2\right)\mathrm{d}x$		
$= \frac{x^6}{6} - \left(-\frac{1}{x}\right) + 2x + c$		
$= \frac{x^6}{6} + \frac{1}{x} + 2x + c$	$4 \times$ MW1	6

			AVAILABLE MARKS
5	**(i)** Cuts x-axis when $y = 0$,		
	i.e. $4 - \frac{8}{x} = 0$		
	$\therefore\ x = 2$	MW1	
	$\therefore$ point P is $(2, 0)$		
	(ii) $\frac{dy}{dx} = \frac{8}{x^2} = 2$ at $x = 2$	MW1	
	$\therefore$ Equation of tangent is		
	$y - 0 = 2(x - 2)$		
	i.e. $y = 2x - 4$	MW1	
	(iii) $\frac{dy}{dx} = \frac{1}{2}$		
	$\therefore\ \frac{8}{x^2} = \frac{1}{2}$	M1	
	$\therefore\ x = 4$ **or** $x = -4$; but $x > 0$		
	$\therefore$ point Q is $(4, 2)$	W1	
	(iv) Equation of tangent is		
	$y - 2 = \frac{1}{2}(x - 4)$	MW1	
	i.e. $y - 2 = \frac{1}{2}x - 2$		
	i.e. $y = \frac{1}{2}x$	W1	
	This passes through $(0, 0)$		7
6	**(i)** $\frac{1-2x}{x-5} - \frac{x+1}{2x+5}$		
	$= \frac{(1-2x)(2x+5)-(x+1)(x-5)}{(x-5)(2x+5)}$	M2	
	$= \frac{(-4x^2-8x+5)-(x^2-4x-5)}{2x^2-5x-25}$	W1, W1	
	$= \frac{-5x^2-4x+10}{2x^2-5x-25}$		
	(ii) $\frac{-5x^2-4x+10}{2x^2-5x-25} = -2$		
	$\therefore\ -5x^2 - 4x + 10 = -2(2x^2 - 5x - 25)$	M2	
	$\therefore\ -5x^2 - 4x + 10 = -4x^2 + 10x + 50$		
	$\therefore\ -x^2 - 14x - 40 = 0$		
	$\therefore\ x^2 + 14x + 40 = 0$	W1	
	$\therefore\ (x + 10)(x + 4) = 0$		
	$\therefore\ x = -10$ **or** $x = -4$	W1	8

AVAILABLE MARKS

7 **(a)** $4^{2x+3} = 3$

$\therefore (2x+3)\log 4 = \log 3$ M2

$\therefore 2x+3 = \dfrac{\log 3}{\log 4}$ M1

$\therefore x = \dfrac{\dfrac{\log 3}{\log 4} - 3}{2}$

$= -1.104$ to 3 dp W1

(b) $\log_2 a = 3$

$\therefore a = 2^3 = 8$ MW1

(c) $\log 36 = \log 6^2 = 2 \log 6 = 2p$ MW1

$\log 9 = \log \dfrac{36}{4}$

$= \log 36 - \log 4$ M1

$= 2p - q$ W1 8

	AVAILABLE MARKS

8 **(i)** $X\hat{O}P = 75 - 47.5 = 27.5°$ MW1

(ii) $PX^2 = OX^2 + OP^2 - 2 \times OX \times OP \cos X\hat{O}P$ M2

$$= 6.25^2 + 3.5^2 - 2 \times 6.25 \times 3.5 \times \cos 27.5$$

$\therefore PX = 3.54\,\text{km}$ W1

(iii) $\dfrac{\sin O\hat{X}P}{OP} = \dfrac{\sin X\hat{O}P}{PX}$ M2

$\therefore \sin O\hat{X}P = \dfrac{3.5 \sin 27.5}{3.54}$

$\therefore O\hat{X}P = 27.16°$ W1

(iv) $X\hat{Z}P = 180 - 47.5 = 132.5°$ MW1

(v) $X\hat{P}Z = 180 - (132.5 + 27.16) = 20.34°$ MW1

(vi) $\dfrac{ZX}{\sin X\hat{P}Z} = \dfrac{PX}{\sin X\hat{Z}P}$ M2

$\therefore ZX = \dfrac{3.54 \sin 20.34}{\sin 132.5}$

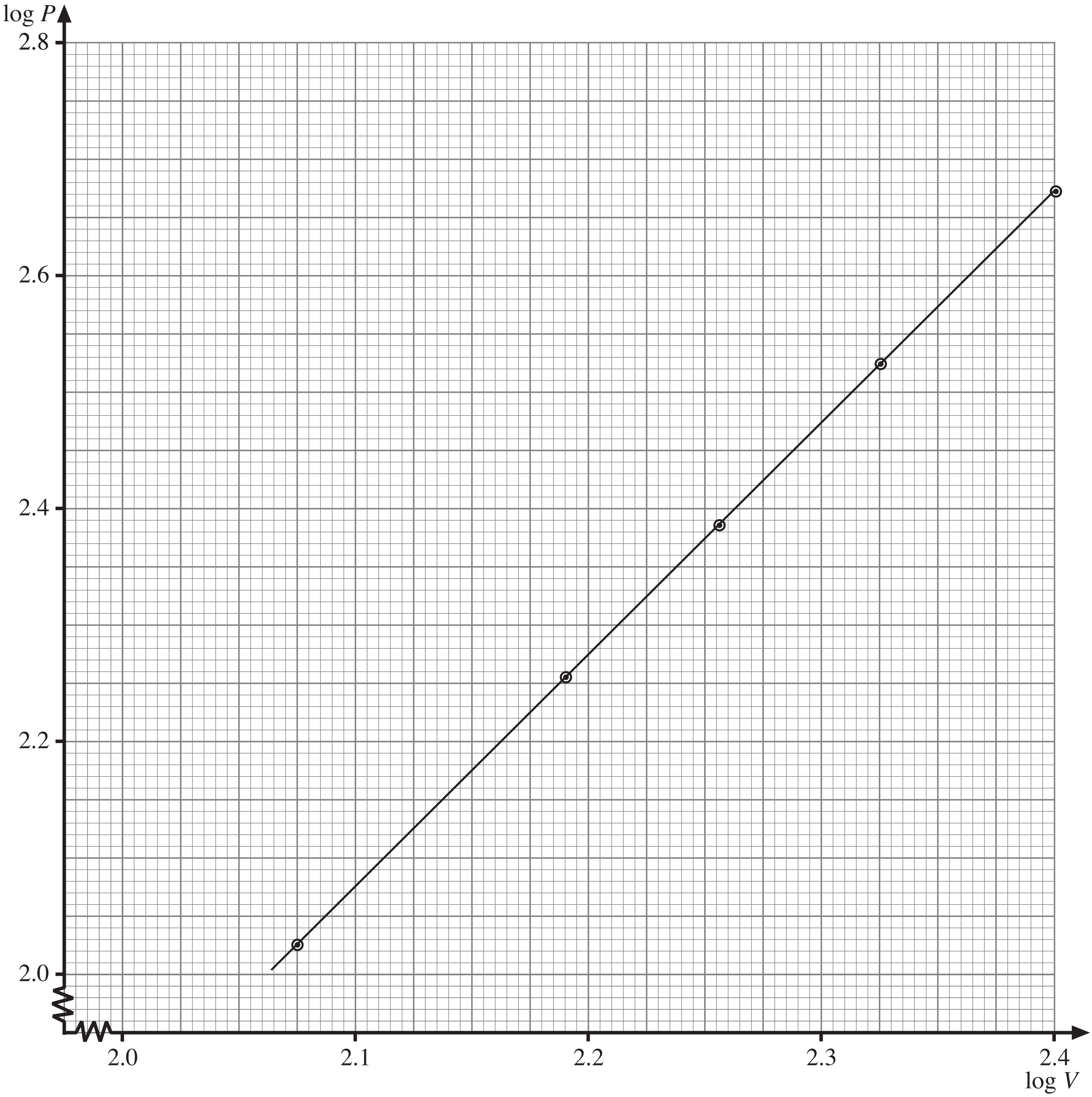
$\therefore ZX = 1.67\,\text{km}$ W1 12

9 **(i)** $P = kV^n$

$\therefore \log P = n \log V + \log k$ M1

$\log V$	$\log P$
2.076	2.029
2.189	2.256
2.252	2.381
2.324	2.525
2.397	2.671

W2



AVAILABLE MARKS

W1 – labels

W1 – points

Straight line graph so relationship is verified. W1 – straight line

(ii) $n = \text{gradient} = \dfrac{2.671 - 2.029}{2.397 - 2.076} = 2$ M1, W1

$P = kV^n \therefore k = \dfrac{P}{V^n} = \dfrac{469.2}{249.5^2} = 0.00754$ M1, W1

so $P = 0.00754V^2$

(iii) $400 = 0.00754V^2$

$\therefore V = \left(\dfrac{400}{0.00754}\right)^{\frac{1}{2}}$ M1

$= 230.3\,\text{km/h}$ W1

(iv) $P = 0.00754 \times 62.8^2$

$= 29.7\,\text{kg/m}^2$ MW1

Assume the formula holds beyond the range of given values. M1 14

AVAILABLE MARKS

10 **(i)** $20x + 8y + 12z = 860$ MW1

$\therefore\ 5x + 2y + 3z = 215 \quad (1)$

(ii) $9x + 9y + 6z = 570$ MW1

$\therefore\ 3x + 3y + 2z = 190 \quad (2)$

(iii) $10(1.2x) + 10(y + 6) + 10(z - 5) = 780$ $3 \times$ MW1

$\therefore\ 12x + 10y + 10z = 780 - 60 + 50 = 770$

$\therefore\ 6x + 5y + 5z = 385 \quad (3)$

(iv) $2 \times (1) - 3 \times (2) \rightarrow x - 5y = -140 \quad (4)$

$5 \times (2) - 2 \times (3) \rightarrow 3x + 5y = 180 \quad (5)$ M2, W2

$(4) + (5) \rightarrow 4x = 40$ M2

$\therefore\ x = 10$

$$\therefore\ y = \frac{180 - 3x}{5} = 30$$

$$\therefore\ z = \frac{215 - 5x - 2y}{3} = 35$$ M1, W1

(v) Jack would have spent

$29 \times 12 + 17 \times 36 + 18 \times 30 = 1500$ M1

i.e. £15.00 W1 15

AVAILABLE MARKS

11 **(i)** For other points when $y = 0$

$$3x^2 + 2x - 5 = 0$$ M1

$$(3x + 5)(x - 1) = 0$$

$$\therefore\ x = -\frac{5}{3} \textbf{ or } x = 1$$

So points are $(-1.67, 0)$ and $(1, 0)$ (to 2 dp) W1

(ii) $y = 3x^3 + 2x^2 - 5x$

$$\frac{dy}{dx} = 9x^2 + 4x - 5 = 0$$ MW1, M1

$$\therefore\ (9x - 5)(x + 1) = 0$$ M1

$$\therefore\ x = \frac{5}{9} \textbf{ or } x = -1$$ W1

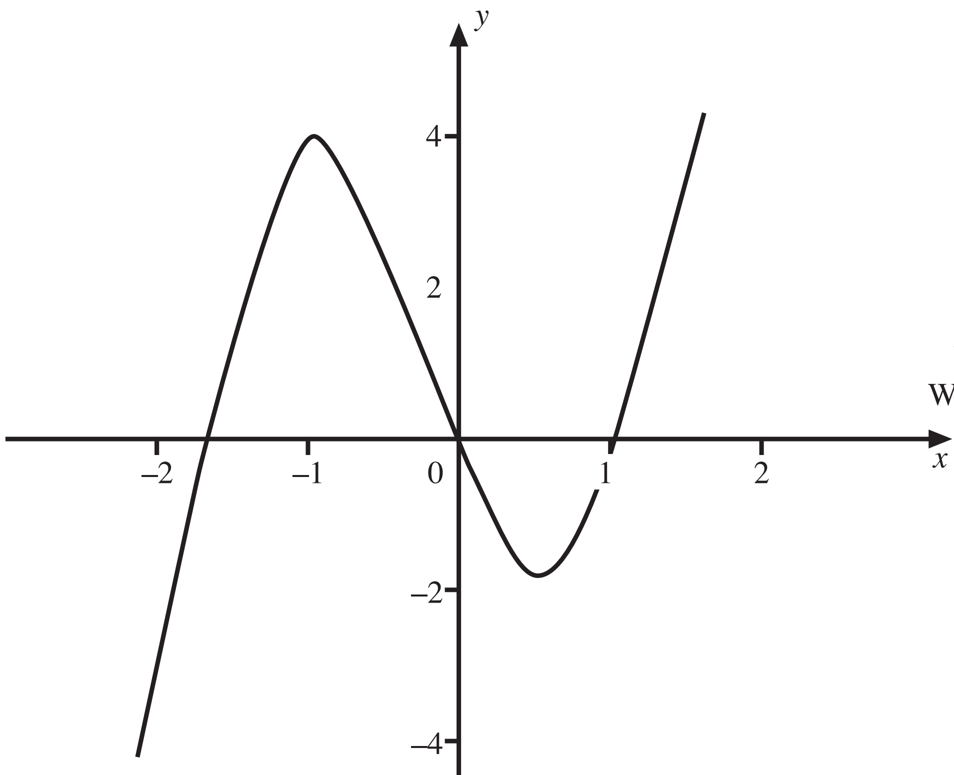
$$\frac{d^2y}{dx^2} = 18x + 4$$ MW1

$$\text{at } x = \frac{5}{9}, \frac{d^2y}{dx^2} = 14 > 0\ \therefore \text{min}$$

$$\text{at } x = -1, \frac{d^2y}{dx^2} = -14 < 0\ \therefore \text{max}$$ M1

So minimum at $(0.56, -1.65)$ (to 2 dp) M1, W1

maximum at $(-1, 4)$



W1 (shape)
W1 (max and min)

W1 (axes)

		AVAILABLE MARKS
(iv) Area $= -\int_0^1 (3x^3 + 2x^2 - 5x)\,dx$	M1	
$= -\left[\frac{3}{4}x^4 + \frac{2}{3}x^3 - \frac{5x^2}{2}\right]_0^1$	MW1	
$= -\left[\frac{3}{4} + \frac{2}{3} - \frac{5}{2}\right] = \frac{13}{12}$		
$= 1.08$ to 2 dp	W1	16
	Total	**100**

Rewarding Learning

General Certificate of Secondary Education
2007

Additional Mathematics

Paper 2
Mechanics and Statistics

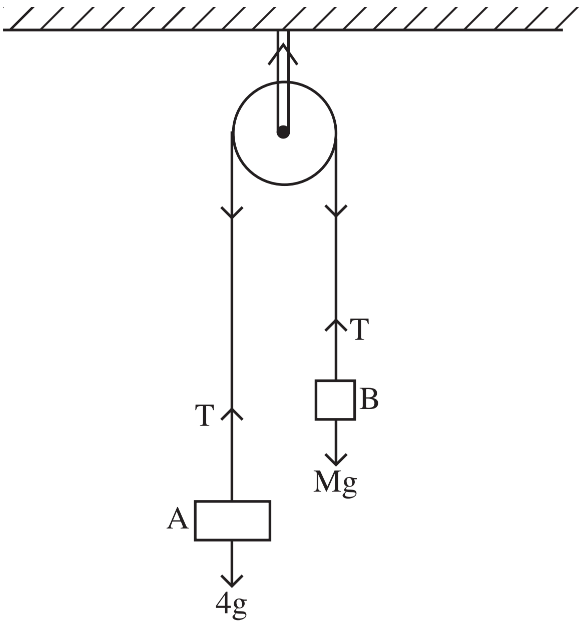
[G0302]

MONDAY 21 MAY, AFTERNOON

MARK SCHEME

AVAILABLE MARKS

1

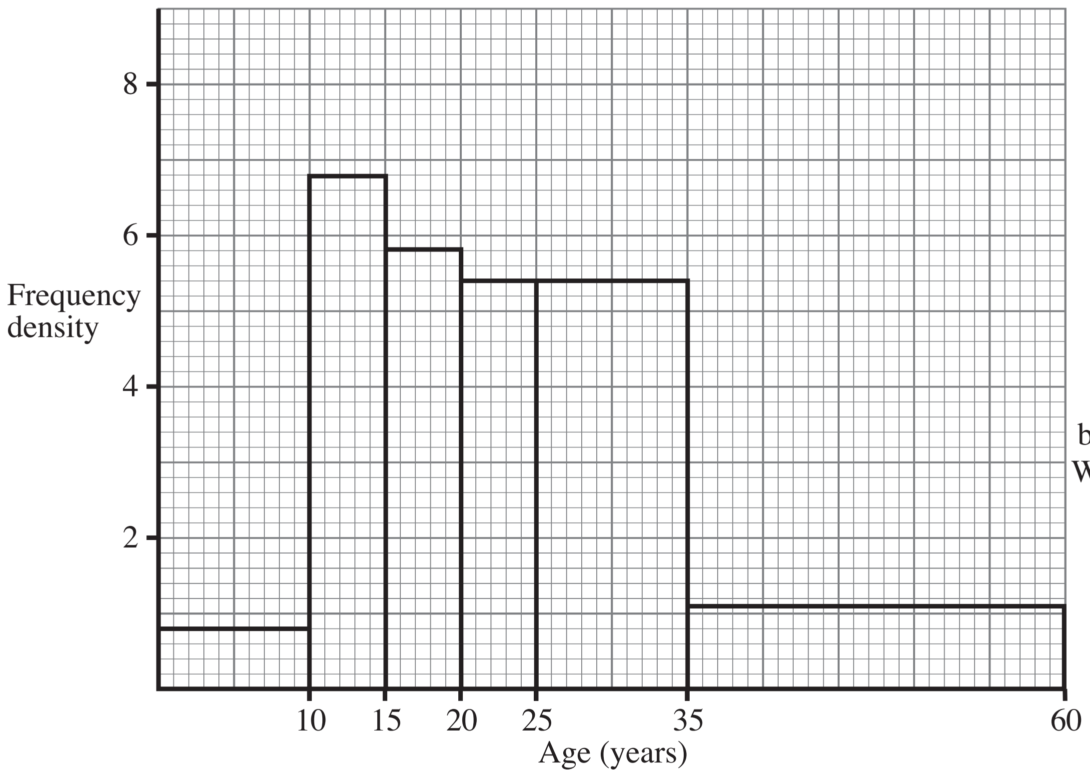


(i) At A	$4g - T = 4(2.5)$	MW1	
	$T = 40 - 10$		
	$T = \underline{30\,N}$	W1	
(ii) At B	$T - Mg = M(2.5)$		
	$30 - Mg = 2.5M$	MW1	
	$10M + 2.5M = 30$		
	$12.5M = 30$		
	$M = 2.4\,kg$	W1	4

AVAILABLE MARKS

2

class width	10	5	5	5	10	25	
frequency density	0.8	6.8	5.8	5.4	5.4	1.12	M1, W1



W1 axes
W1cts scale at boundaries
W1 heights

5

AVAILABLE MARKS

3 **(i)** $p(4\mathbf{i} + \mathbf{j}) + q(2\mathbf{i} - 3\mathbf{j}) = 5\mathbf{i} - 4\mathbf{j}$

$4p\mathbf{i} + p\mathbf{j} + 2q\mathbf{i} - 3q\mathbf{j} = 5\mathbf{i} - 4\mathbf{j}$

$(4p + 2q)\,\mathbf{i} + (p - 3q)\,\mathbf{j} = 5\mathbf{i} - 4\mathbf{j}$ MW1

$\Rightarrow 4p + 2q = 5$

$\Rightarrow \quad p - 3q = -4 \qquad \times -4$ MW1

$-4p + 12q = 16$

$\underline{4p + \ \ 2q = 5}$

$14q = 21$

$\Rightarrow \quad q = 1.5$

$p - 4.5 = -4$ W1

$\Rightarrow \quad p = 0.5$

$$\left.\begin{array}{l} p = 0.5 \\ q = 1.5 \end{array}\right\}$$

(ii) $3\mathbf{a} - 3\mathbf{b} + 2\mathbf{c} = 3(4\mathbf{i} + \mathbf{j}) - 3(2\mathbf{i} - 3\mathbf{j}) + 2(5\mathbf{i} - 4\mathbf{j})$

$12\mathbf{i} + 3\mathbf{j} - 6\mathbf{i} + 9\mathbf{j} + 10\mathbf{i} - 8\mathbf{j}$

$\Rightarrow 16\mathbf{i} + 4\mathbf{j}$ MW1

$|16\mathbf{i} + 4\mathbf{j}| = \sqrt{16^2 + 4^2} = \sqrt{272} = 16.49$

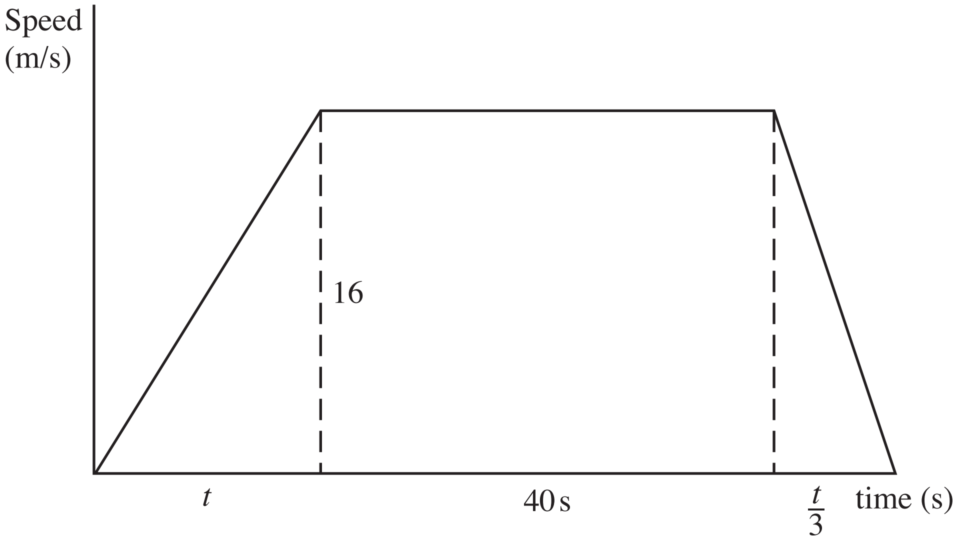
$\Rightarrow |16\mathbf{i} + 4\mathbf{j}| = \underline{16.5 \text{ to 1 decimal place}}$ MW1

(iii) $\tan\theta = \dfrac{4}{16}$

$\Rightarrow \theta \underline{= 14.0°}$ MW1 6

AVAILABLE MARKS

4 **(i)**



W1

W1

(ii) Total time $= t + 40 + \frac{t}{3} = \frac{4}{3}t + 40$ MW1

$$\Rightarrow \frac{4}{3}t + 40 = 56$$

$$\Rightarrow \frac{4}{3}t = 16$$

$$\Rightarrow t = \frac{3 \times 16}{4} = \underline{12\,\text{s}}$$ W1

(iii) Total distance travelled $= \frac{1}{2}(56 + 40) \cdot 16.$ MW1, MW1

$= 96 \times 8 = \underline{768\,\text{m}}$ W1

or

using $v = u + at$

$16 = 0 + 12a \Rightarrow a = \frac{16}{12} = \frac{4}{3}\text{m/s}^2$ MW1

Distance while accelerating $s_1 = 0 + \frac{1}{2} \times \frac{4}{3} \times 144 = 96\,\text{m}$

Distance while at constant speed $s_2 = 40 \times 16 = 640\,\text{m}$ MW1

Distance while retarding $s_3 = (16 \times 4) + \frac{1}{2}(-4)(16) = 64 - 32$

$= 32\,\text{m}$

Total distance travelled $= 96 + 640 + 32$

$= \underline{768\,\text{m}}$ W1 7

					AVAILABLE MARKS
5 **(i)** rank music	rank photos	$\lvert d \rvert$	d^2		
5.5	5	0.5	0.25		
7	3	4	16		
3	4	1	1		
4	7	3	9	M1, W1	
2	6	4	16		
5.5	1.5	4	16		
1	1.5	0.5	0.25		
			58.5		

(ii) $r = 1 - \dfrac{6\sum d^2}{n(n^2-1)}$ M2 $\sum d^2$

$r = 1 - \dfrac{6 \times 58.5}{7 \times 48} = -0.04$ M1, W1

(iii) No significance M1 7

6 **(i)** mean $= \dfrac{75}{5} = 15$ MW1

s.d. $= \sqrt{\left(\dfrac{1305}{5} - 225\right)}$ M1

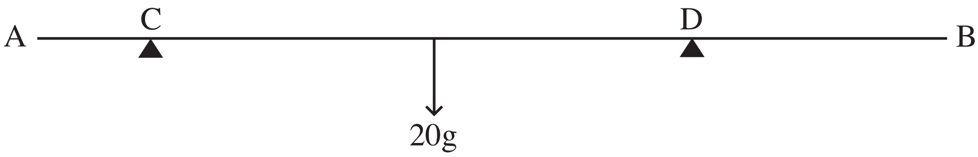
$= 6$ W1

(ii) $a = 2$ M1

$\dfrac{75(2) + 5b}{5} = 40$

$b = 10$ M2, W1 7

7



(i) At $\overset{\curvearrowright}{D}$ $C \times 5 = 20g \times 2$ MW1

$5C = 40g$

$C\uparrow = 8g\,N = \underline{80\,N}$ W1

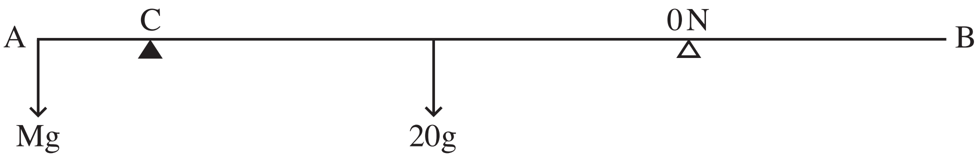
(ii) $C\uparrow + D\uparrow = 20g$

$80 + D\uparrow = 200$

$\Rightarrow D\uparrow = 120\,N$ W1

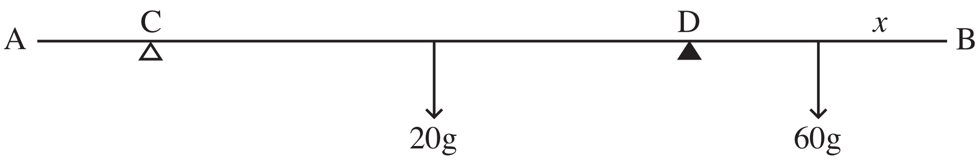
(iii) The reaction at D is zero W1

(iv)



At $\overset{\curvearrowright}{C}$ $Mg \times 1 = 20g \times 3$ MW1

$\Rightarrow M = 60\,kg$ W1



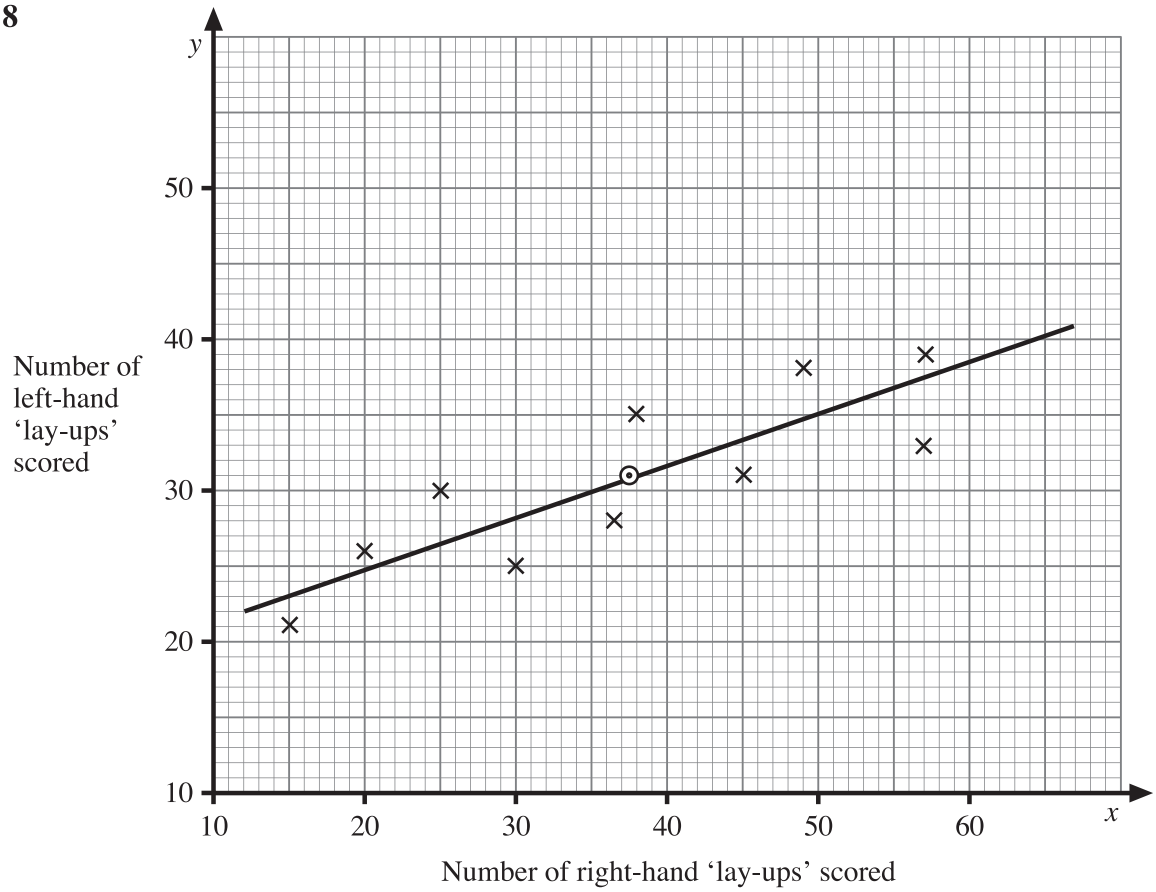
(v) At $\overset{\curvearrowright}{D}$ $20g \times 2 = 60g(2 - x)$ MW1, MW1

$40 = 120 - 60x$

$\Rightarrow 60x = 80$

$x = \frac{8}{6} = \frac{4}{3} = \underline{1\tfrac{1}{3}m}$ W1 9

8



(a) **(i)** Mean right = 37.3, Mean left = 30.6 MW1

(ii) On graph MW1 (mean)

MW1 (slope)

(iii) $m = 0.33$ M1, W1

$c = 18.35$ M1, W1

$y = 0.33x + 18.35$

(iv) $0.33 \times 50 + 18.35 \simeq 35$ MW1

(b) 30.5 MW1 9

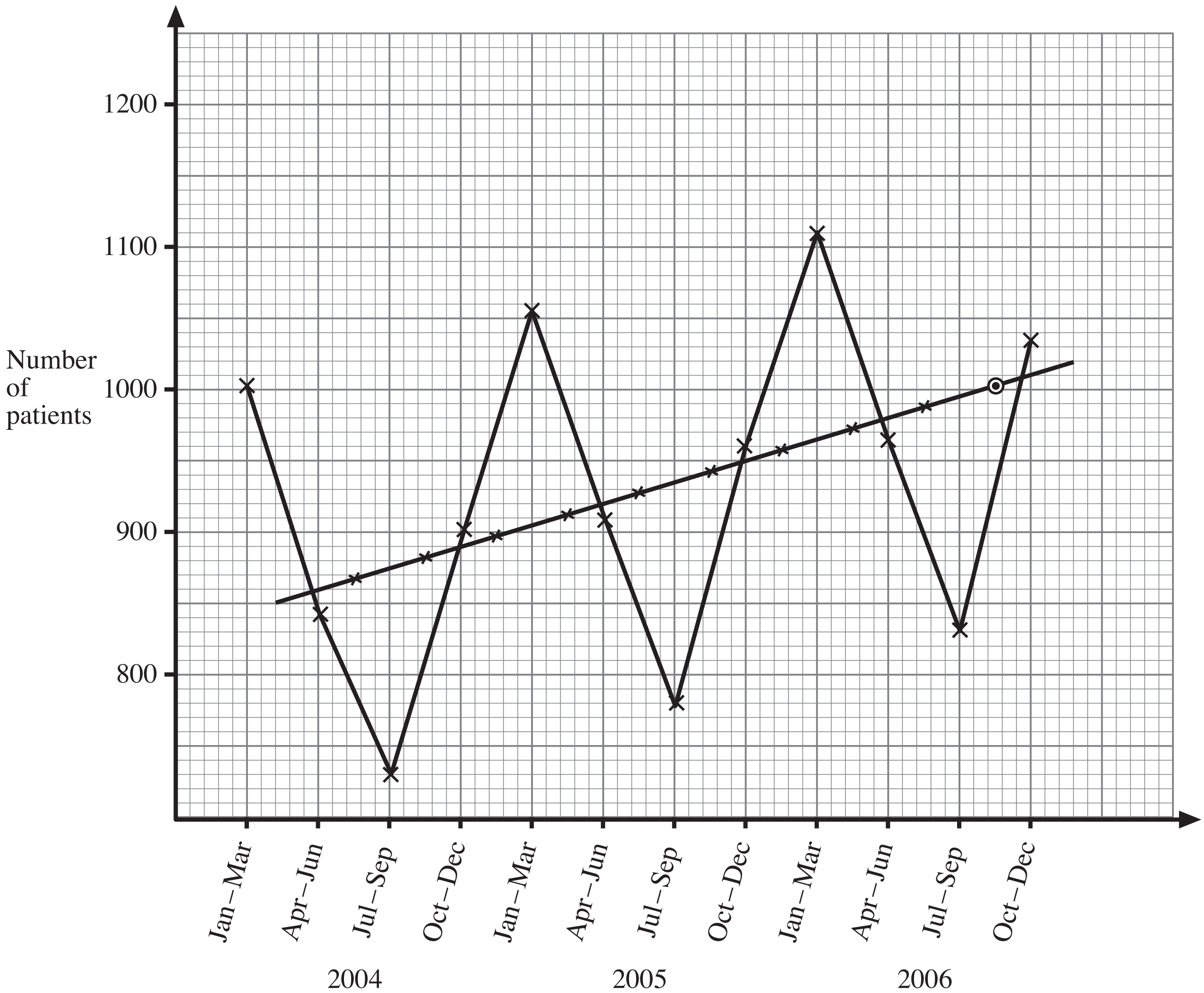
AVAILABLE MARKS

9 **(i)** 4 pt moving averages

868
881
897
911
928
942
957
970
987

M2, W1

(ii) M2 set, W1 line



AVAILABLE MARKS

(iii) $$\frac{x + 1036 + 836 + 965}{4} = 1000$$ M1, W1 reading

$x = 1163$ M1, W1 | 10

AVAILABLE MARKS

10 At maximum height $v = 0$

$\Rightarrow v^2 = u^2 + 2as$

$\Rightarrow 0 = 8^2 - 2(10) \cdot s$ MW1

$\Rightarrow s = \frac{64}{20} = \underline{3.2\,\text{m}}$ W1

So maximum height above pavement = 10 + 3.2 = $\underline{13.2\,\text{m}}$ MW1

(ii) $v^2 = u^2 + 2as$

$\Rightarrow v^2 = 0 + 2 \times 10(13.2) = 264$ MW1

$\Rightarrow v = \sqrt{264} = \underline{16.2\,\text{m/s}}$ (to 1 decimal place) W1

(iii) time to reach greatest height = t_1

$v = u + at$

$\Rightarrow 0 = 8 - 10t_1$

$\Rightarrow t_1 = 0.8$ secs MW1

time from greatest height to pavement = t_2

$s = ut + \frac{1}{2}at^2$

$13.2 = 0 + \frac{1}{2} \times 10 \times t_2^2$ MW1

$\Rightarrow t_2^2 = 2.64$

$\Rightarrow t_2 = \sqrt{2.64} = 1.6\,\text{s}$ W1

Total time = 0.8 + 1.6 = $\underline{2.4\,\text{s}}$ MW1

(iv) Speed of rebound = 8.1 m/s

$v^2 = u^2 + 2as$

$\Rightarrow 0 = 8.1^2 + 2(-10)s$ MW1

$\Rightarrow S = \frac{8.1^2}{20} = 3.28 = \underline{3.3\,\text{m}}$ to 1 decimal place W1 11

		AVAILABLE MARKS

11 **(i)**

		red				
	1,1	1,2	1,3	1,4	1,5	1,6
	2,1	2,2	2,3	2,4	2,5	2,6
blue	2,1	2,2	2,3	2,4	2,5	2,6
	3,1	3,2	3,3	3,4	3,5	3,6
	3,1	3,2	3,3	3,4	3,5	3,6
	3,1	3,2	3,3	3,4	3,5	3,6

P(both prime) $= \frac{15}{36} = \frac{5}{12}$ M1, W1

(ii) P(total prime) $= \frac{16}{36} = \frac{4}{9}$ M1, W1

(iii) P(1,1/prime) $= \frac{1}{16}$ M2, W1

(iv) P($b > r$) $= \frac{8}{36} = \frac{2}{9}$ M1, W1

(v) P(no double) $= \left(\frac{30}{36}\right)^6 = \left(\frac{5}{6}\right)^6 = \frac{15\,625}{46\,656} \simeq 0.33$ MW1, MW1

(vi) P(at least 1 double) $= 1 - \left(\frac{5}{6}\right)^6$

$= \frac{31\,031}{46\,656} \simeq 0.67$ MW1 12

alternative solution on next page

or

11 **(i)**

Blue	Red			
2	2, 3, 5	$2/6 \times 3/6 = 6/36$	$15/36 = 5/12$	M1
3	2, 3, 5	$3/6 \times 3/6 = 9/36$		W1

(ii)

Blue	Red			
1	1, 2, 4, 6	$1/6 \times 4/6 = 4/36$		
2	1, 3, 5	$2/6 \times 3/6 = 6/36$	$16/36 = 4/9$	M1
3	2, 4	$3/6 \times 2/6 = 6/36$		W1

(iii) From **(ii)**, P(both 1/total is prime) = $1/(4 + 6 + 6) = 1/16$ M2 W1

(iv)

Blue	Red			
2	1	$2/6 \times 1/6 = 2/36$	$8/36 = 2/9$	M1
3	1, 2	$3/6 \times 2/6 = 6/36$		W1

(v)

Blue	Red		
1	1	$1/6 \times 1/6 = 1/36$	
2	2	$2/6 \times 1/6 = 2/36$	$6/36 = 1/6$
3	3	$3/6 \times 1/6 = 3/36$	

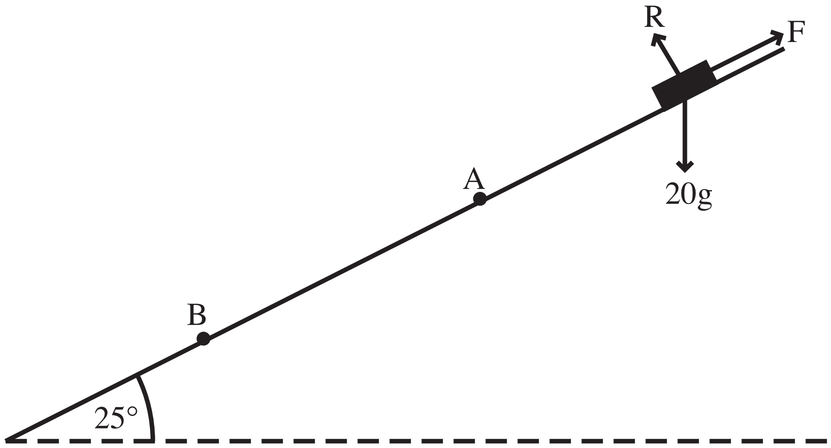
P(double) = $1/6 \Rightarrow$ P(no double) = $5/6$ M1

P(no double in 6 throws) = $(5/6)^6 \approx 0.33$ W1

(vi) From **(v)**, P(at least 1 double in 6 throws) $\approx 1 - 0.33 \approx 0.67$ MW1

AVAILABLE MARKS

12 (i)



$2 \times$ W1

(ii) between A and B using $v^2 = u^2 + 2as$

$4^2 = 2^2 + 2a(4)$ MW1

$16 = 4 + 8a$

$\Rightarrow 8a = 12$

$\Rightarrow a = \underline{1.5\ \text{m/s}^2}$ W1

(iii) $20g \sin 25 - F = 20(1.5)$ MW1 (direction of F)

$\Rightarrow F = 20g \sin 25 - 30$ MW1 (20g sin 25)

$\Rightarrow F = 84.523 - 30$ MW1 (equation)

$\Rightarrow F = 54.5\ \text{N}$ (to 1 decimal place) W1 (answer)

(iv) $R = 20g \cos 25 = 181.26 = 181.3\ \text{N}$ MW1

$F = \mu R$

$\Rightarrow 54.5 = \mu \times 181.3$ MW1

$\Rightarrow \mu = \dfrac{54.5}{181.3} = 0.3$ (to 1 decimal place) W1

(v) using $v = u + at$

$\Rightarrow v = 2 + (1.5) \times 2 = 2 + 3 = \underline{5\ \text{m/s}}$ MW1

(vi) $S = ut + \frac{1}{2} at^2$

$S = 2(2) + \frac{1}{2}(1.5) \times 2^2 = 4 + 3 = \underline{7\ \text{m}}$ MW1 13

Total **100**